

# EXHIBIT 75

COLOR



# AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

Procedure:	Rev:	Rev. Date:	Release Trac #
<b>AV1200-1A</b>	<b>A</b>	<b>2012-06-07</b>	<b>1575</b>

In Relation To:  
**NASA STD 8739.1A / IPC J-STD-001**

Target Audience:  
**AVIONICS**



Revision	Description	Date
<b>A</b>	<b>AV1200-1A Per Release Trac Ticket #1575</b>	<b>2012/06/08</b>

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## AV1200-1A Rev A



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## 4 GENERAL GUIDELINES

### 4.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use a respirator, safety glasses, gloves, or other Personal Protective Equipment (PPE) as needed for fumes and to protect the boards from contamination by skin contact. The MSDSs for the Conformal Coating products say to use them in a well-ventilated area.



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## 6 CONFORMAL COATING

When a conformal coating is specified to be applied to a PCBA follow these steps:

### 6.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use gloves, eye protection and facemask, in a well-ventilated areas per the MSDS.

#### 6.1.1 Approved Conformal Coating Products Used by the Avionics Clean Room

Table 6-1 Approved Conformal Coating Products

Approved Component	Part Number	Vendor	Application
Conformal Coating	1A33	HumiSeal	Spray + Brush
Thinner	521	HumiSeal	Spray + Brush
Stripper	1063	HumiSeal	Spray + Brush

#### 6.1.2 Products Being Phased Out

TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, is being phased out and will be used to touch up boards that have already been coated with TechSpray. IPA is used to clean boards coated with TechSpray.



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## 6.2 Preparation

### 6.2.1 Cleaning Coated Boards

- Prior to these Conformal Coating procedures, the boards must have been cleaned per AV2012 Avionics Assembly / Part Cleaning Standard.
- **HumiSeal:** When performing minor cleaning of a board that has been Conformal Coated with HumiSeal Conformal Coating, Type UR, PN 1A33, use HumiSeal Thinner 521. Do NOT use IPA to clean boards coated with HumiSeal PN 1A33. To remove HumiSeal PN1A33 in order to perform rework, use HumiSeal Stripper 1063.
- **TechSpray:** When performing minor cleaning or removal of TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, use IPA.

### 6.2.2 Conformal Coating Mix and Viscosity Check

- In the machine Conformal Coating tank, mix the Conformal Coating, Type UR, with Thinner: 3 parts Conformal Coating to 1 part Thinner.
- After mixing the Conformal Coating, check its viscosity using a Zahn Size 2 Viscosity Cup and a calibrated stopwatch.
- Dip the Viscosity Cup into the Conformal Coating tank and start the stopwatch exactly when you lift it up out of the Conformal Coating. Stop the stopwatch exactly when the Viscosity Cup is empty of Conformal Coating.
- The time it takes for the Conformal Coating to completely drain out of the Viscosity Cup should be between 20 and 21 seconds. If the viscosity is not within this range, mix in some more Thinner, for decreasing viscosity, or some more Conformal Coating, for increasing viscosity, as applicable, and measure the viscosity again until it is within the range.
- Record the viscosity on the Conformal Coating Lot Log Sheet in Appendix A. This includes recording viscosity on the Conformal Coating Lot Log Sheet for manual application and touchup of batches of 5 boards or more

### 6.2.3 Dispensing Conformal Coating for Application and Touch-up

- Dispense the Conformal Coating, Type UR, from the PVA machine by pressing the F4 button, holding a container under the nozzle, and then pressing and holding the Purge button. To stop dispensing, let go of the Purge button.
- After dispensing the Conformal Coating, Type UR, from the nozzle, press the F1 button to send the nozzle back to its home position. Wipe off the tip of the nozzle.



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#### 6.2.4 Verifying Proper Spray Thickness

- Refer to the drawing to confirm the type and target thickness of the Conformal Coating. Write the Conformal Coating type and lot code on the Conformal Coating Lot Log Sheet in Appendix A. Randomly choose one of the 10 aluminum coupons for a Thickness Test. In Figure 6-1 below, Coupon #10 has been chosen. Write the coupon number in the blank next to Coupon Number on the Conformal Coating Lot Log Sheet in Appendix A. Make sure that the aluminum coupon is completely clean of Conformal Coating; clean it with Thinner or Stripper if it is not.

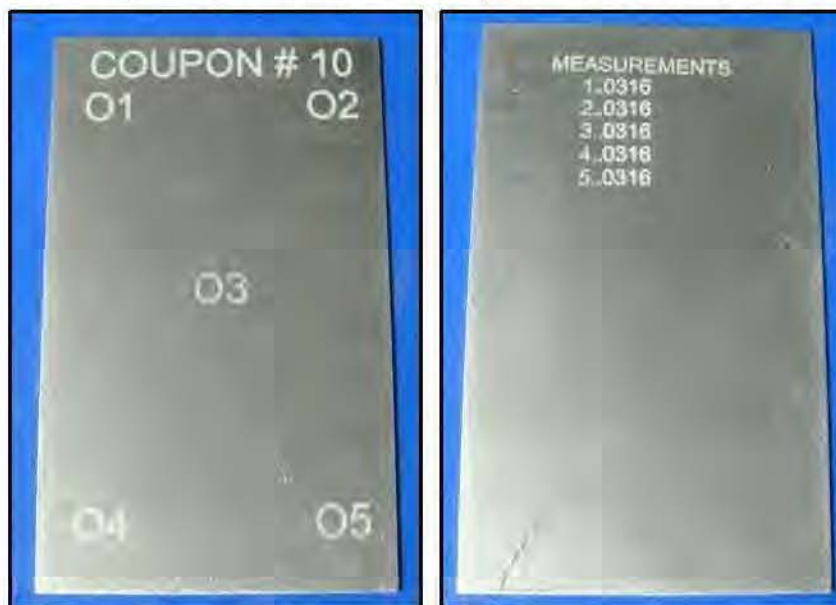


Figure 6-1 Aluminum Coupon #10

- Measure the thickness of the coupon inside each of the five circles (shaped like a 0) to four decimal places (example – 0.0001) with a calibrated micrometer, to verify the thicknesses engraved on the back of the coupon. Write the thickness of each numbered circle (shaped like an O) in the cells in Row B (Bare Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See Section 10 Appendix B for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- Initialize and stabilize the spray from the nozzle on the machine by spraying a piece of dummy cardboard before spraying the aluminum coupon.
- Put the aluminum coupon into the Conformal Coating machine and adjust the brackets to hold it in place. See Figure 6-2 below.



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Figure 6-2 Adjusting the Brackets in the Machine to Hold the Coupon in Place

- Program the machine per operating instructions in the PVA Manual. Spray the aluminum coupon completely with the target thickness of Conformal Coating, Type UR, per drawing.
- Let the Conformal Coating on the aluminum coupon cure at ambient room temperature and humidity for 30 minutes, then oven cure it for one hour at 60°C / 140°F. Allow the aluminum coupon to cool in the oven for 30 minutes, with the temperature ramping down to ambient. *Do not record the cure start and end times and cure temperature on the Conformal Coating Lot Log Sheet in Appendix A; you will later record the cure information for the boards themselves there.*
- Measure the thickness of the aluminum coupon inside each of the five numbered circles with the micrometer, to four decimal places (example – 0.0001). Write these measurements in the cells in Row A (CC'd Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See 10 for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- For each of the five numbered circles, subtract the measurement in Row B (Bare Coupon) from the measurement in Row A (CC'd Coupon). Write the result in the cells in Row C (CC Thickness) for each numbered circle.
- Add up the five results in Row C (CC Thickness) and divide by five. You now have the Final Averaged Conformal Coating Thickness; write it in the blank next to Final Averaged CC Thickness.
- Compare the Final Averaged Conformal Coating Thickness with the target thickness specified by the drawing:
  - If the Final Averaged Conformal Coating Thickness is within the specified range, continue to next Step to prepare for board masking.
  - Otherwise, repeat all of the Steps in this section using a new coupon, until the Final Averaged Conformal Coating Thickness is within the range specified by the drawing.



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### 6.2.5 Board Preparation

- Write the board Part Number and Serial Numbers on the Conformal Coating Lot Log Sheet in Appendix A. There is room for 90 serial numbers. If you have more than 90 boards in your lot, attach another page to the back of the Conformal Coating Lot Log Sheet with the rest of the Serial Numbers.
- Use Kapton tape, Kapton dots, keep out fixtures, or flex mask to mask the areas of the board where the drawing specifies that they must not have conformal coating on them. All other areas shall be coated with conformal coat. See Figure 6-3 below for masking instructions and Notes on a drawing. See Figure 6-4 below for the masking process in action.

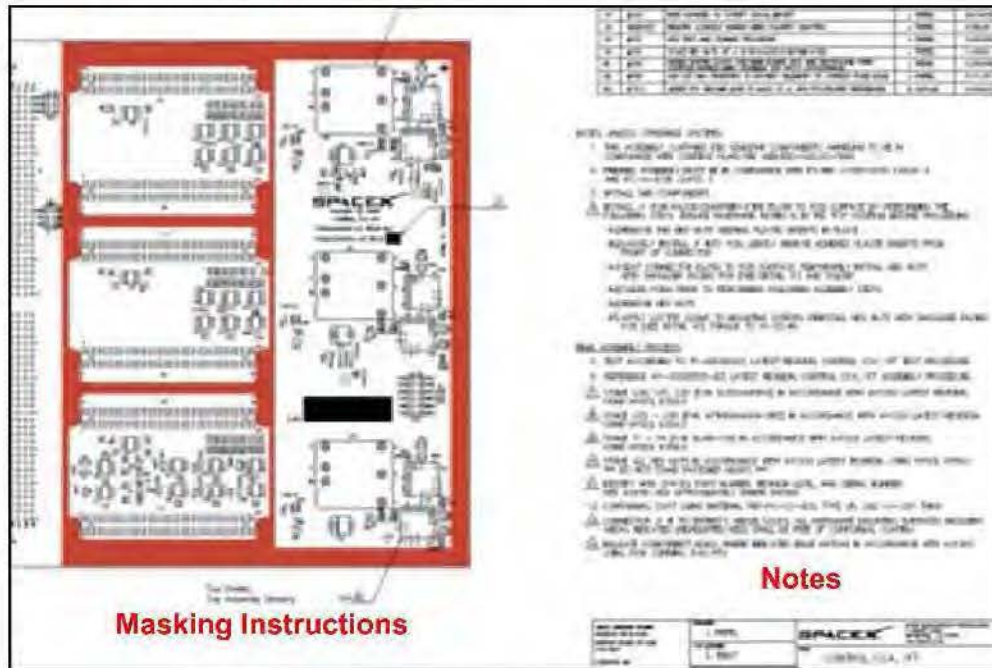


Figure 6-3 Masking Instructions and Notes on a Drawing



Figure 6-4 Peeling and Placing Kapton Dots



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## 6.3 Application

### 6.3.1 Manual Application

- When applying Conformal Coating by hand, it should be applied under the UV (ultraviolet) light, so that the operator can clearly see the areas covered by conformal coating.
- For brush application, the size and type of brush will depend upon the area being coated. A small brush will be necessary for boards with numerous connectors (as connectors shall not be coated with Conformal Coating). For larger areas of Conformal Coating, larger brushes may be used.

### 6.3.2 PVA Machine Application

- Program the machine to spray the correct areas, using the operating instructions in the PVA Manual.
- Adjust the brackets in the machine to hold the board or boards in place during spraying.
- Spray the board or boards with the Conformal Coating, Type UR, using the machine operating instructions in the PVA Manual, at exactly the same thickness that you sprayed the aluminum coupon.

### 6.3.3 Conformal Coating Cure

#### 6.3.3.1 Ambient Cure

- Cure Conformal Coating for 24 hours.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

#### 6.3.3.2 Oven Cure

- First, cure Conformal Coating at ambient room temperature and humidity for 30 minutes.
- Next, oven cure Conformal Coating for one hour at 65°C / 149°F. Allow the boards to cool down to ambient temperature.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

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#### 6.3.4 Conformal Coating Lot Log Sheet

- Each lot of boards is to be inspected, the results of the Touch Test (below-Inspection) recorded, dated and stamped off in the Coating Lot Log Sheet (Appendix A) by the Technician and Inspection. Scanned Log Sheet will be attached to Work Order in Warp Drive.

##### Inspection

Conformal coated boards are visually inspected by QA under UV (ultraviolet) light. Any rework of conformal coating shall meet the original configuration.

After 24 hours, perform a Touch Test on one of the five coated areas on the sample coupon. If touching the Conformal Coating leaves a fingerprint, the sample fails. Record the results of the Touch Test on the Conformal Coating Lot Log Sheet in Appendix A.



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# AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

Procedure:	Rev:	Rev. Date:	Release Trac #
<b>AV1200-1A</b>	<b>B</b>	<b>2012-08-17</b>	<b>5401</b>

In Relation To:  
**NASA STD 8739.1A / IPC J-STD-001**

Target Audience:  
**AVIONICS**



Revision	Description	Date
<b>A</b>	<b>AV1200-1A Per Release Trac Ticket #1575</b>	<b>2012/06/08</b>
<b>B</b>	<b>Per Release Trac Ticket #5401</b>	<b>2012/08/17</b>

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## 4 GENERAL GUIDELINES

### 4.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use a respirator, safety glasses, gloves, or other Personal Protective Equipment (PPE) as needed for fumes and to protect the boards from contamination by skin contact. The MSDSs for the Conformal Coating products say to use them in a well-ventilated area.

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## 6 CONFORMAL COATING

When a conformal coating is specified to be applied to a PCBA follow the steps below.

### 6.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
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- Use gloves, eye protection and facemask, in a well-ventilated areas per the MSDS.

#### 6.1.1 Approved Conformal Coating Products Used by the Avionics Clean Room

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Approved Component	Part Number	Vendor	Application
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#### 6.1.2 Products Being Phased Out

TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, is being phased out and will be used to touch up boards that have already been coated with TechSpray. IPA is used to clean boards coated with TechSpray.



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## 6.2 Preparation

### 6.2.1 Cleaning Coated Boards

- Prior to these Conformal Coating procedures, the boards must have been cleaned per AV2012 Avionics Assembly / Part Cleaning Standard.
- **HumiSeal:** When performing minor cleaning of a board that has been Conformal Coated with HumiSeal Conformal Coating, Type UR, PN 1A33, use HumiSeal Thinner 521. Do NOT use IPA to clean boards coated with HumiSeal PN 1A33. To remove HumiSeal PN1A33 in order to perform rework, use HumiSeal Stripper 1063.
- **TechSpray:** When performing minor cleaning or removal of TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, use IPA.

### 6.2.2 Conformal Coating Mix and Viscosity Check

- In the machine Conformal Coating tank, mix the Conformal Coating, Type UR, with Thinner: 3 parts Conformal Coating to 1 part Thinner.
- After mixing the Conformal Coating, check its viscosity using a Zahn Size 2 Viscosity Cup and a calibrated stopwatch.
- Dip the Viscosity Cup into the Conformal Coating tank and start the stopwatch exactly when you lift it up out of the Conformal Coating. Stop the stopwatch exactly when the Viscosity Cup is empty of Conformal Coating.
- The time it takes for the Conformal Coating to completely drain out of the Viscosity Cup should be between 20 and 21 seconds. If the viscosity is not within this range, mix in some more Thinner, for decreasing viscosity, or some more Conformal Coating, for increasing viscosity, as applicable, and measure the viscosity again until it is within the range.
- Record the viscosity on the Conformal Coating Lot Log Sheet in Appendix A. This includes recording viscosity on the Conformal Coating Lot Log Sheet for manual application and touchup of batches of 5 boards or more

### 6.2.3 Dispensing Conformal Coating for Application and Touch-up

- Dispense the Conformal Coating, Type UR, from the PVA machine by pressing the F4 button, holding a container under the nozzle, and then pressing and holding the Purge button. To stop dispensing, let go of the Purge button.
- After dispensing the Conformal Coating, Type UR, from the nozzle, press the F1 button to send the nozzle back to its home position. Wipe off the tip of the nozzle.



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#### 6.2.4 Verifying Proper Spray Thickness

- Refer to the drawing to confirm the type and target thickness of the Conformal Coating. Write the Conformal Coating type and lot code on the Conformal Coating Lot Log Sheet in Appendix A. Randomly choose one of the 10 aluminum coupons for a Thickness Test. In Figure 6-1 below, Coupon #10 has been chosen. Write the coupon number in the blank next to Coupon Number on the Conformal Coating Lot Log Sheet in Appendix A. Make sure that the aluminum coupon is completely clean of Conformal Coating; clean it with Thinner or Stripper if it is not.

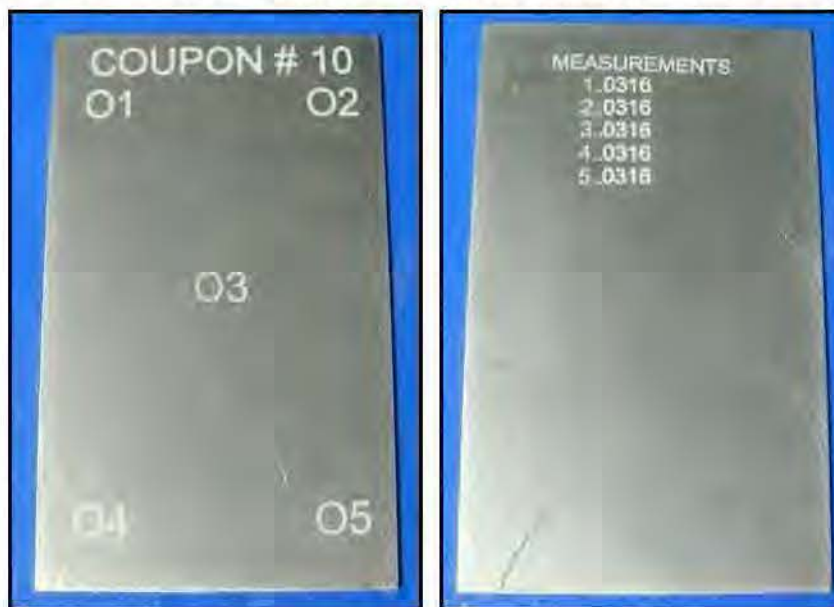


Figure 6-1 Aluminum Coupon #10

- Measure the thickness of the coupon inside each of the five circles (shaped like a O) to four decimal places (example – 0.0001) with a calibrated micrometer, to verify the thicknesses engraved on the back of the coupon. Write the thickness of each numbered circle (shaped like an O) in the cells in Row B (Bare Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See Section 10 Appendix B for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- Initialize and stabilize the spray from the nozzle on the machine by spraying a piece of dummy cardboard before spraying the aluminum coupon.
- Put the aluminum coupon into the Conformal Coating machine and adjust the brackets to hold it in place. See Figure 6-2 below.



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Figure 6-2 Adjusting the Brackets in the Machine to Hold the Coupon In Place

- Program the machine per operating instructions in the PVA Manual. Spray the aluminum coupon completely with the target thickness of Conformal Coating, Type UR, per drawing.
- Let the Conformal Coating on the aluminum coupon cure at ambient room temperature and humidity for 30 minutes, then oven cure it for one hour at 60°C / 140°F. Allow the aluminum coupon to cool in the oven for 30 minutes, with the temperature ramping down to ambient. *Do not record the cure start and end times and cure temperature on the Conformal Coating Lot Log Sheet in Appendix A; you will later record the cure information for the boards themselves there.*
- Measure the thickness of the aluminum coupon inside each of the five numbered circles with the micrometer, to four decimal places (example – 0.0001). Write these measurements in the cells in Row A (CC'd Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See 10 for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- For each of the five numbered circles, subtract the measurement in Row B (Bare Coupon) from the measurement in Row A (CC'd Coupon). Write the result in the cells in Row C (CC Thickness) for each numbered circle.
- Add up the five results in Row C (CC Thickness) and divide by five. You now have the Final Averaged Conformal Coating Thickness; write it in the blank next to Final Averaged CC Thickness.
- Compare the Final Averaged Conformal Coating Thickness with the target thickness specified by the drawing:
  - If the Final Averaged Conformal Coating Thickness is within the specified range, continue to next Step to prepare for board masking.
  - Otherwise, repeat all of the Steps in this section using a new coupon, until the Final Averaged Conformal Coating Thickness is within the range specified by the drawing.



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### 6.2.5 Board Preparation

- Write the board Part Number and Serial Numbers on the Conformal Coating Lot Log Sheet in Appendix A. There is room for 90 serial numbers. If you have more than 90 boards in your lot, attach another page to the back of the Conformal Coating Lot Log Sheet with the rest of the Serial Numbers.
- Use Kapton tape, Kapton dots, keep out fixtures, or flex mask to mask the areas of the board where the drawing specifies that they must not have conformal coating on them. All other areas shall be coated with conformal coat. See Figure 6-3 below for masking instructions and Notes on a drawing. See Figure 6-4 below for the masking process in action.

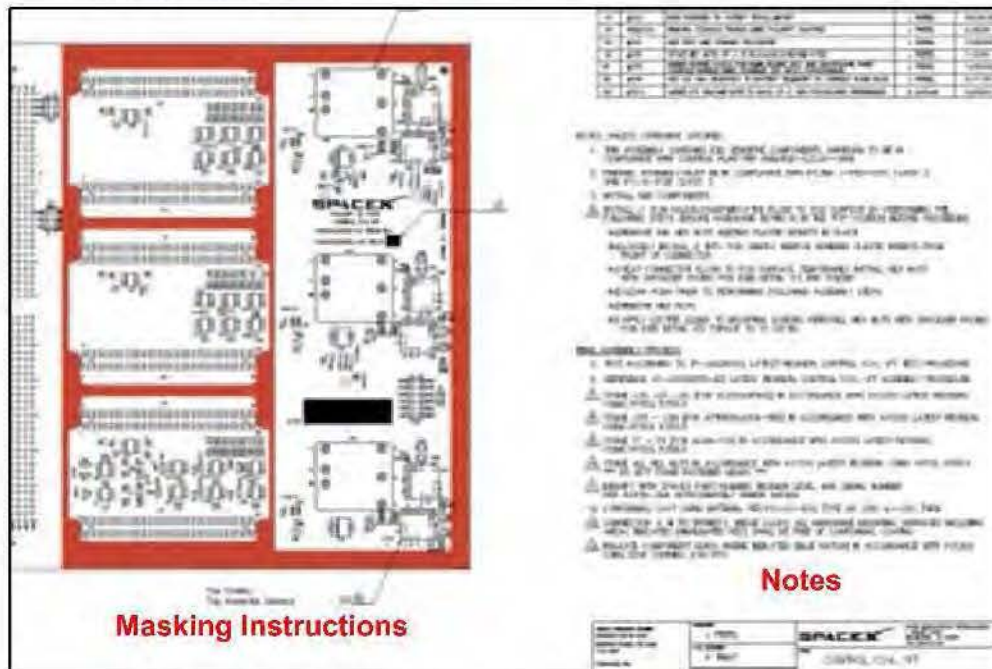


Figure 6-3 Masking Instructions and Notes on a Drawing



Figure 6-4 Peeling and Placing Kapton Dots



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## 6.3 Application

### 6.3.1 Manual Application

- When applying Conformal Coating by hand, it should be applied under the UV (ultraviolet) light, so that the operator can clearly see the areas covered by conformal coating.
- For brush application, the size and type of brush will depend upon the area being coated. A small brush will be necessary for boards with numerous connectors (as connectors shall not be coated with Conformal Coating). For larger areas of Conformal Coating, larger brushes may be used.

### 6.3.2 PVA Machine Application

- Program the machine to spray the correct areas, using the operating instructions in the PVA Manual.
- Adjust the brackets in the machine to hold the board or boards in place during spraying.
- Spray the board or boards with the Conformal Coating, Type UR, using the machine operating instructions in the PVA Manual, at exactly the same thickness that you sprayed the aluminum coupon.

### 6.3.3 Conformal Coating Cure

#### 6.3.3.1 Ambient Cure

- Cure Conformal Coating for 24 hours.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

#### 6.3.3.2 Oven Cure

- First, cure Conformal Coating at ambient room temperature and humidity for 30 minutes.
- Next, oven cure Conformal Coating for one hour at 65°C / 149°F. Allow the boards to cool down to ambient temperature.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

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#### 6.3.4 Conformal Coating Lot Log Sheet

- Each lot of boards is to be inspected, the results of the Touch Test (below-Inspection) recorded, dated and stamped off in the Coating Lot Log Sheet (Appendix A) by the Technician and Inspection. Scanned Log Sheet will be attached to Work Order in Warp Drive.

##### Inspection

Conformal coated boards are visually inspected by QA under UV (ultraviolet) light. Any rework of conformal coating shall meet the original configuration.

After 24 hours, perform a Touch Test on one of the five coated areas on the sample coupon. If touching the Conformal Coating leaves a fingerprint, the sample fails. Record the results of the Touch Test on the Conformal Coating Lot Log Sheet in Appendix A.



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# AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

Procedure:	Rev:	Rev. Date:	Release Trac #
<b>AV1200-1A</b>	<b>C</b>	<b>2013-05-17</b>	<b>6367</b>
In Relation To:		Target Audience:	
<b>NASA STD 8739.1A / IPC J-STD-001</b>		<b>AVIONICS</b>	



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<b>A</b>	<b>AV1200-1A Per Release Trac Ticket #1575</b>	<b>2012/06/08</b>
<b>B</b>	<b>Per Release Trac Ticket #5401</b>	<b>2012/08/17</b>
<b>C</b>	<b>Per Release Trac Ticket #6367</b>	<b>2013/05/17</b>

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**Juarez v PVA SPX 1108**

**CONFIDENTIAL**



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

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## 4 GENERAL GUIDELINES

### 4.1 PRECAUTIONS

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use a respirator, safety glasses, gloves, or other Personal Protective Equipment (PPE) as needed for fumes and to protect the boards from contamination by skin contact. The MSDSs for the Conformal Coating products say to use them in a well-ventilated area.

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## 6 CONFORMAL COATING

When a conformal coating is specified to be applied to a PCBA follow the steps below.

### 6.1 PRECAUTIONS

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use gloves, eye protection and facemask, in a well-ventilated areas per the MSDS.

#### 6.1.1 Approved Conformal Coating Products Used by the Avionics Clean Room

Table 6-1 Approved Conformal Coating Products

Approved Component	Part Number	Vendor	Application
Conformal Coating	1A33	HumiSeal	Spray + Brush
Thinner	521	HumiSeal	Spray + Brush
Stripper	1063	HumiSeal	Spray + Brush

#### 6.1.2 Products Being Phased Out

TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, is being phased out and will be used to touch up boards that have already been coated with TechSpray. IPA is used to clean boards coated with TechSpray.



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## 6.2 PREPARATION

### 6.2.1 Cleaning Coated Boards

- Prior to these Conformal Coating procedures, the boards must have been cleaned per AV2012 Avionics Assembly / Part Cleaning Standard.

### 6.2.2 Conformal Coating Mix and Viscosity Check

- In the machine Conformal Coating tank, mix the Conformal Coating, Type UR, with Thinner. 3 parts Conformal Coating to 1 part Thinner.
- After mixing the Conformal Coating, check its viscosity using a Zahn Size 2 Viscosity Cup and a calibrated stopwatch.
- Dip the Viscosity Cup into the Conformal Coating tank and start the stopwatch exactly when you lift it up out of the Conformal Coating. Stop the stopwatch exactly when the Viscosity Cup is empty of Conformal Coating.
- The time it takes for the Conformal Coating to completely drain out of the Viscosity Cup should be between 20 and 21 seconds. If the viscosity is not within this range, mix in some more Thinner, for decreasing viscosity, or some more Conformal Coating, for increasing viscosity, as applicable, and measure the viscosity again until it is within the range.
- Record the viscosity on the Conformal Coating Lot Log Sheet in Appendix A. This includes recording viscosity on the Conformal Coating Lot Log Sheet for manual application and touchup of batches of 5 boards or more

### 6.2.3 Dispensing Conformal Coating for Application and Touch-up

- Dispense the Conformal Coating, Type UR, from the PVA machine by pressing the F4 button, holding a container under the nozzle, and then pressing and holding the Purge button. To stop dispensing, let go of the Purge button.
- After dispensing the Conformal Coating, Type UR, from the nozzle, press the F1 button to send the nozzle back to its home position. Wipe off the tip of the nozzle.



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#### 6.2.4 Verifying Proper Spray Thickness

- Refer to the drawing to confirm the type and target thickness of the Conformal Coating. Write the Conformal Coating type and lot code on the Conformal Coating Lot Log Sheet in Appendix A. Randomly choose one of the 10 aluminum coupons for a Thickness Test. In Figure 6-1 below, Coupon #10 has been chosen. Write the coupon number in the blank next to Coupon Number on the Conformal Coating Lot Log Sheet in Appendix A. Make sure that the aluminum coupon is completely clean of Conformal Coating; clean it with Thinner or Stripper if it is not.

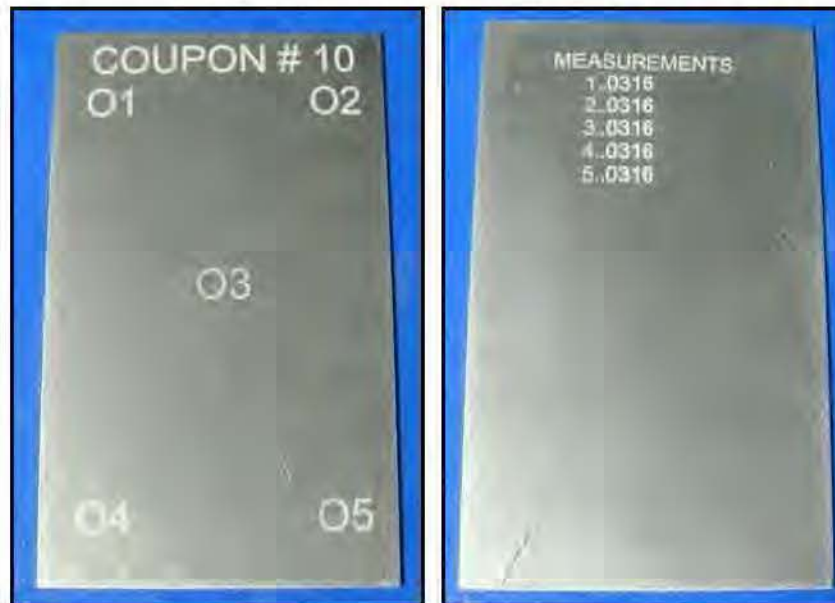


Figure 6-1 Aluminum Coupon #10

- Measure the thickness of the coupon inside each of the five circles (shaped like a 0) to four decimal places (example – 0.0001) with a calibrated micrometer, to verify the thicknesses engraved on the back of the coupon. Write the thickness of each numbered circle (shaped like an O) in the cells in Row B (Bare Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See Section 10 Appendix B for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- Initialize and stabilize the spray from the nozzle on the machine by spraying a piece of dummy cardboard before spraying the aluminum coupon.
- Put the aluminum coupon into the Conformal Coating machine and adjust the brackets to hold it in place. See Figure 6-2 below.



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Figure 6-2 Adjusting the Brackets in the Machine to Hold the Coupon In Place

- Program the machine per operating instructions in the PVA Manual. Spray the aluminum coupon completely with the target thickness of Conformal Coating, Type UR, per drawing.
- Let the Conformal Coating on the aluminum coupon cure at ambient room temperature and humidity for 30 minutes, then oven cure it for one hour at 60°C / 140°F. Allow the aluminum coupon to cool in the oven for 30 minutes, with the temperature ramping down to ambient. Do not record the cure start and end times and cure temperature on the Conformal Coating Lot Log Sheet in Appendix A; you will later record the cure information for the boards themselves there.
- Measure the thickness of the aluminum coupon inside each of the five numbered circles with the micrometer, to four decimal places (example – 0.0001). Write these measurements in the cells in Row A (CC'd Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See 10 for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- For each of the five numbered circles, subtract the measurement in Row B (Bare Coupon) from the measurement in Row A (CC'd Coupon). Write the result in the cells in Row C (CC Thickness) for each numbered circle.
- Add up the five results in Row C (CC Thickness) and divide by five. You now have the Final Averaged Conformal Coating Thickness; write it in the blank next to Final Averaged CC Thickness.
- Compare the Final Averaged Conformal Coating Thickness with the target thickness specified by the drawing:
  - If the Final Averaged Conformal Coating Thickness is within the specified range, continue to next Step to prepare for board masking.
  - Otherwise, repeat all of the Steps in this section using a new coupon, until the Final Averaged Conformal Coating Thickness is within the range specified by the drawing.



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## 6.3 THICKNESS REQUIREMENT

- IPC-CC-830 Type UR (Urethane based material) shall be applied to meet the following thickness:

Material	Thickness (Inch)
Humiseal 1A33	0.002 ± 0.001

## 6.4 BOARD PREPARATION

- Write the board Part Number and Serial Numbers on the Conformal Coating Lot Log Sheet in Appendix A. There is room for 90 serial numbers. If you have more than 90 boards in your lot, attach another page to the back of the Conformal Coating Lot Log Sheet with the rest of the Serial Numbers.
- Masking Areas:** Masking area instructions are designated by keep out areas on the engineering drawing. See Figure 6-3 below for masking instructions and Notes on a drawing. Use Kapton tape, Kapton dots, keep out fixtures, or flex mask to mask the areas of the board where the drawing specifies that they must not have conformal coating on them. All other areas shall be coated with conformal coat.
- Masking Fasteners:** Masking fasteners instructions are designated by either a Note on the drawing to mask the drive feature of the fastener or being encompassed by the Masking Area instructions. At the minimum the drive feature of the fastener must remain free of conformal coating using Kapton tape, Kapton dots, keep out fixtures, or flex mask.
- See Figure 6-4 below for the masking process in action.



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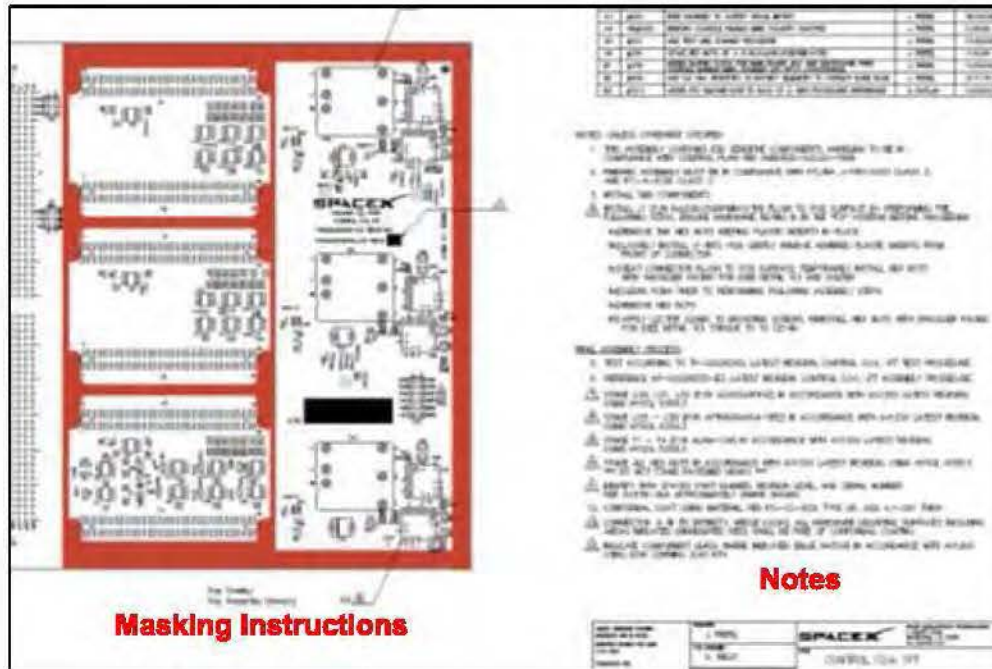


Figure 6-3 Masking Instructions and Notes on a Drawing



Figure 6-4 Peeling and Placing Kapton Dots

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## 6.5 APPLICATION

### 6.5.1 Manual Application

- When applying Conformal Coating by hand, it should be applied under the UV (ultraviolet) light, so that the operator can clearly see the areas covered by conformal coating.
- For brush application, the size and type of brush will depend upon the area being coated. A small brush will be necessary for boards with numerous connectors (as connectors shall not be coated with Conformal Coating). For larger areas of Conformal Coating, larger brushes may be used.

### 6.5.2 PVA Machine Application

- Program the machine to spray the correct areas, using the operating instructions in the PVA Manual.
- Adjust the brackets in the machine to hold the board or boards in place during spraying.
- Spray the board or boards with the Conformal Coating, Type UR, using the machine operating instructions in the PVA Manual, at exactly the same thickness that you sprayed the aluminum coupon.

### 6.5.3 Conformal Coating Cure

#### 6.5.3.1 Ambient Cure

- Cure Conformal Coating for 24 hours.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

#### 6.5.3.2 Oven Cure

- First, cure Conformal Coating at ambient room temperature and humidity for 30 minutes.
- Next, oven cure Conformal Coating for one hour at 65°C / 149°F. Allow the boards to cool down to ambient temperature.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.



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#### 6.5.4 Conformal Coating Lot Log Sheet

- Each lot of boards is to be inspected, the results of the Touch Test (below-Inspection) recorded, dated and stamped off in the Coating Lot Log Sheet (Appendix A) by the Technician and Inspection. Scanned Log Sheet will be attached to Work Order in Warp Drive.

##### 6.5.4.1 Inspection

Conformal coated boards are visually inspected by QA under UV (ultraviolet) light. Any rework of conformal coating shall meet the original configuration.

After 24 hours, perform a Touch Test on one of the five coated areas on the sample coupon. If touching the Conformal Coating leaves a fingerprint, the sample fails. Record the results of the Touch Test on the Conformal Coating Lot Log Sheet in Appendix A.